

CLAIMS

1. A wound-healing composition, comprising:

a wound-treating component; and

5 vesicles,

wherein the vesicles comprise:

a phospholipid which is a stable vesicle former; and

ATP.

2. The wound-healing composition of claim 1, wherein the wound-treating

10 component comprises at least one member selected from the group consisting of an antiseptic, an antibiotic, and an anesthetic.

3. The wound-healing composition of claim 1, wherein the wound-treating component comprises becaplermin.

4. The wound-healing composition of claim 1, wherein the vesicles have a

15 fusion rate of at least 20 vesicle fusions/second.

5. The wound-healing composition of claim 1, wherein the vesicles further comprise another polar lipid.

6. The wound-healing composition of claim 1, wherein the vesicles further comprise at least one member selected from the group consisting of PEG, a raft former, and a fusion protein.

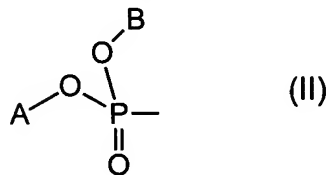
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7. The wound-healing composition of claim 1, wherein the vesicles further comprise PEG.

8. The wound-healing composition of claim 5, wherein the phospholipid or the another polar lipid that has the structure of formula (I)



wherein X is H, or has a structure of formula (II)



B is a cation or an alkyl group,

A is a H or an alkyl group,

L is an alkyl further missing two hydrogen atoms, and

each Z is independently H, E, or the structure of formula (XI),

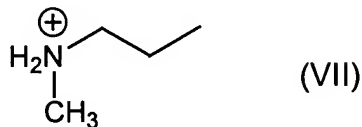
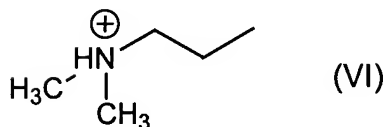
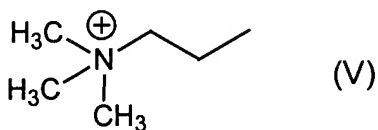
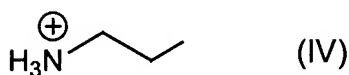
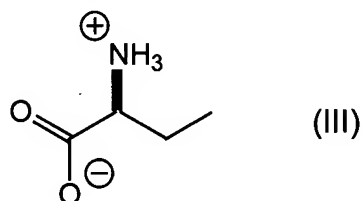


wherein E is an alkyl or alkenyl, and when one Z is H, the other Z is not H.

9. The wound-healing composition of claim 8, wherein

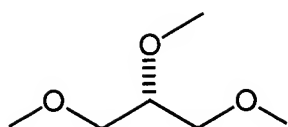
A is H, or has a structure selected from the group consisting of formulas (III),

(IV), (V), (VI) and (VII)

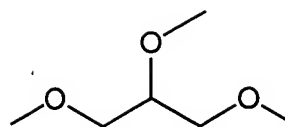


L has a structure selected from the group consisting of formulas (VIII), (IX) or

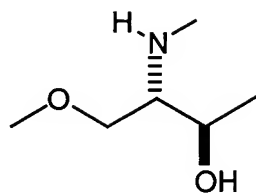
(X)



(VIII)

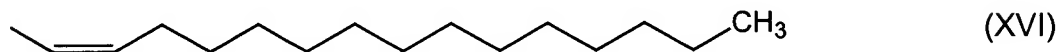
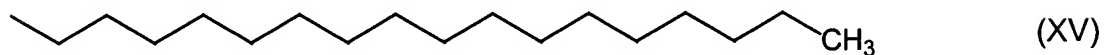
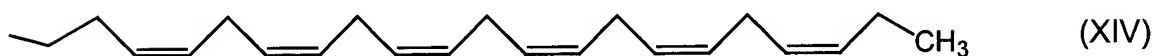
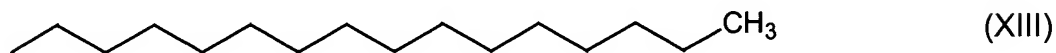
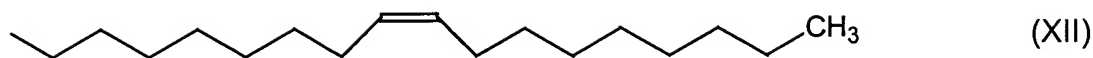


(IX)



(X)

and E has a structure selected from the group consisting of (XII), (XIII), (XIV), (XV) or (XVI)



10. The wound-healing composition of claim 9, wherein the phospholipid is 1,2-dioleoyl-sn-glycero-3-phosphocholine, 1-palmitoyl-2-docosahexaenoyl-sn-glycero-3-phosphocholine, or mixtures thereof.

11. The wound-healing composition of claim 9, wherein the wound-treating component comprises at least one member selected from the group consisting of an antiseptic, an antibiotic, and an anesthetic.

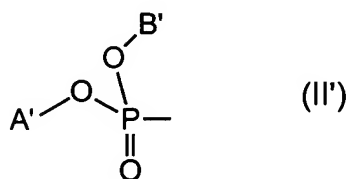
12. The wound-healing composition of claim 9, wherein the wound-treating component comprises becaplermin.

13. The wound-healing composition of claim 1, wherein the phospholipid has

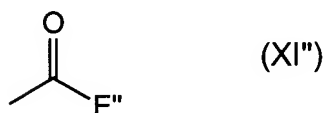
the structure of formula (I')



wherein X' has a structure of formula (II')



- 5 B' is a cation or an alkyl group, and
A' is an alkyl group;
wherein L' is an alkyl further missing two hydrogen atoms; and
wherein one Z' is E'', or the structure of formula (XI''),



- 10 wherein E'' is an alkyl or alkenyl, and
the other Z is E', or the structure of formula (XI'),



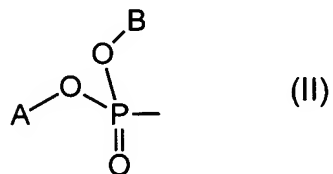
wherein E' is an alkenyl.

14. The wound-healing composition of claim 1, wherein the vesicles further
15 comprise at least one member selected from the group consisting of a polar lipid which is
not a stable vesicle former and PEG,

wherein the phospholipid has a structure of formula (I)



wherein X is H, or has a structure of formula (II)



- 20 B is a cation or an alkyl group,

A is a H or an alkyl group,

L is an alkyl further missing two hydrogen atoms, and

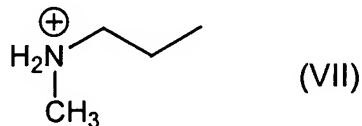
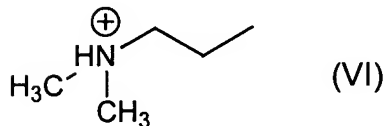
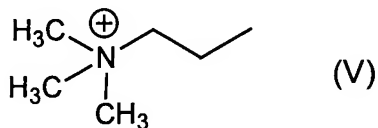
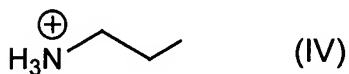
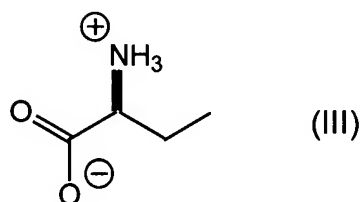
each Z is independently H, E, or the structure of formula (XI),



5 wherein E is an alkyl or alkenyl, and when one Z is H, the other Z is not H.

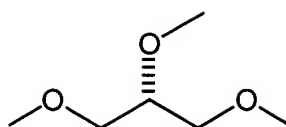
15. The wound-healing composition of claim 14, wherein

A is H, or has a structure selected from the group consisting of formulas (III), (IV), (V), (VI) and (VII)

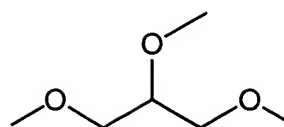


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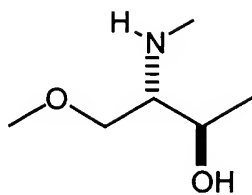
L has a structure selected from the group consisting of formulas (VIII), (IX) or (X)



(VIII)

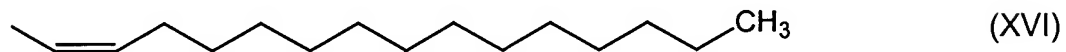
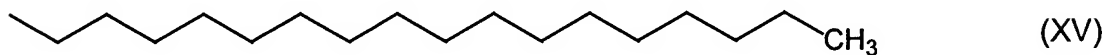
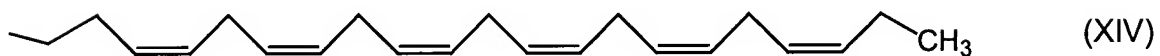
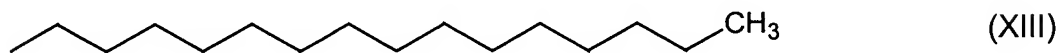
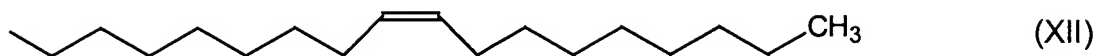


(IX)



(X)

and E has a structure selected from the group consisting of (XII), (XIII), (XIV), (XV) or (XVI)

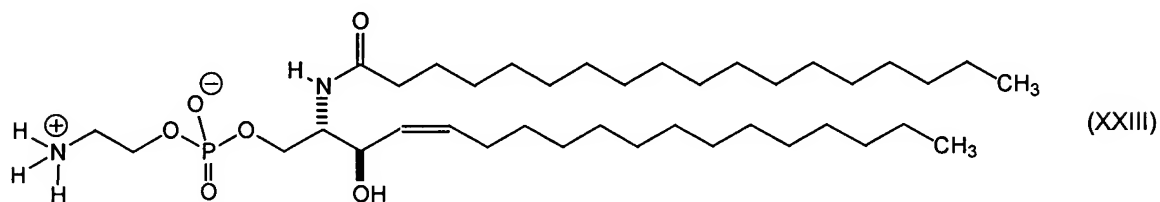
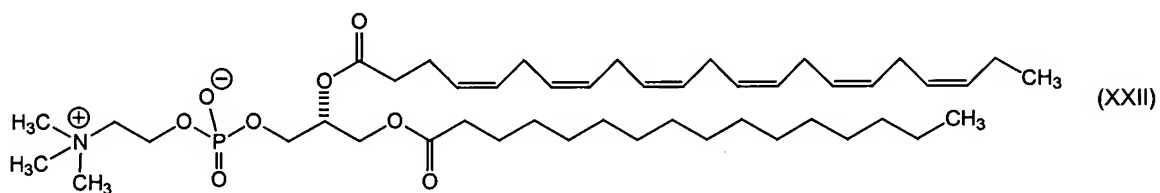
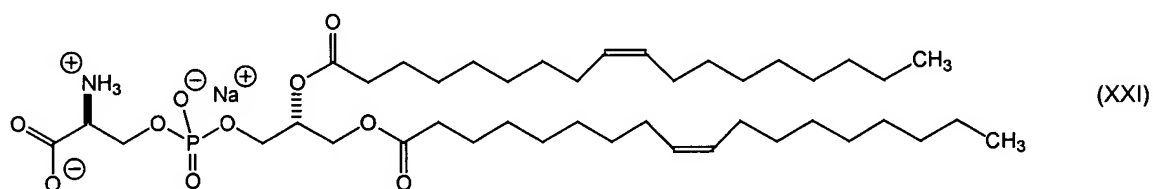
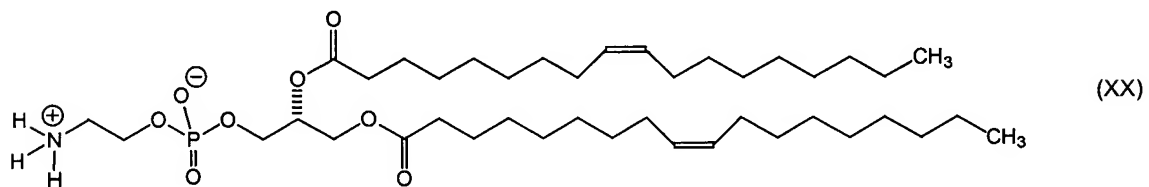
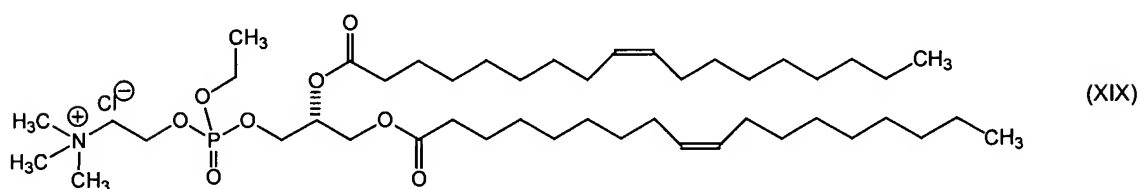
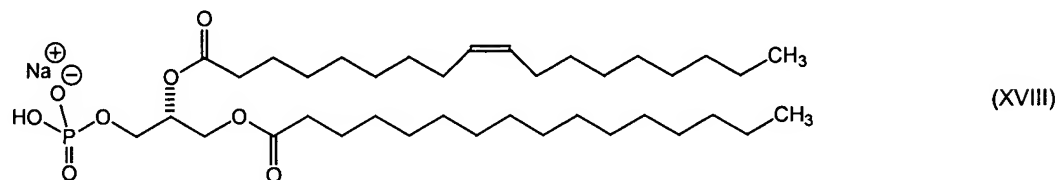
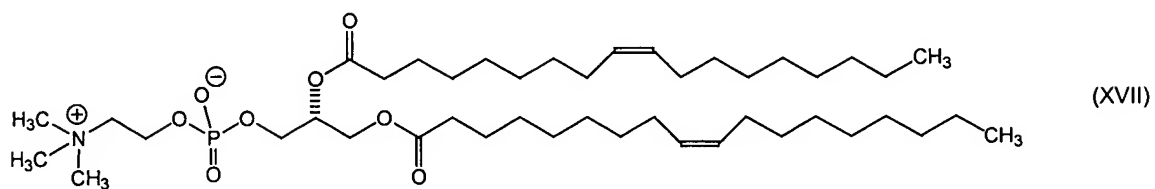


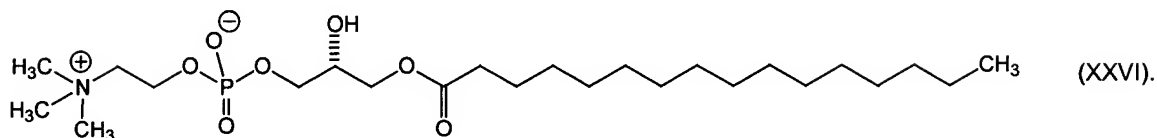
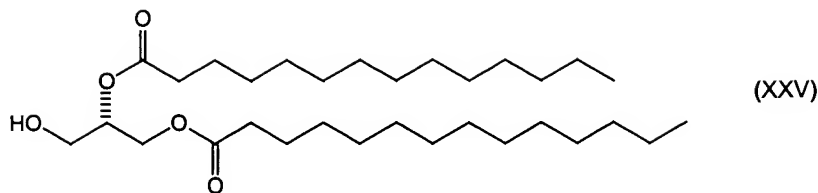
16. The wound-healing composition of claim 14, wherein the phospholipid is 1,2-dioleoyl-sn-glycero-3-phosphocholine, 1-palmitoyl-2-docosahexaenoyl-sn-glycero-3-phosphocholine, or mixtures thereof.

17. The wound-healing composition of claim 14, further comprising at least one member selected from the group consisting of PEG, a raft former, and a fusion protein.

18. The wound-healing composition of claim 14, wherein the vesicles further comprise a polar lipid which is not a stable vesicle former, wherein the polar lipid which is not a stable vesicle former has the structure selected from the group consisting of

formulas (XVII), (XVIII), (XIX), (XX), (XXI), (XXII), (XXIII), (XXV) and (XXVI)





19. The wound-healing composition of claim 14, wherein the wound-treating component comprises at least one member selected from the group consisting of an antiseptic, an antibiotic, and an anesthetic.

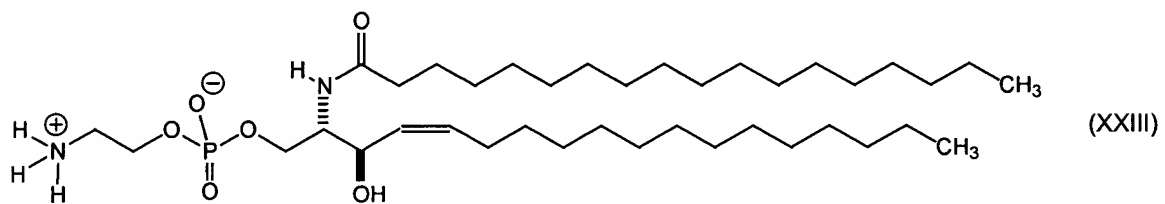
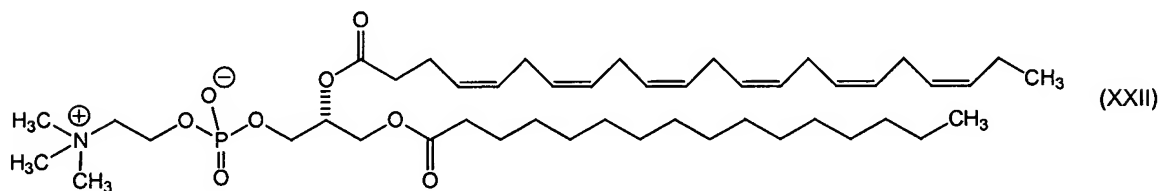
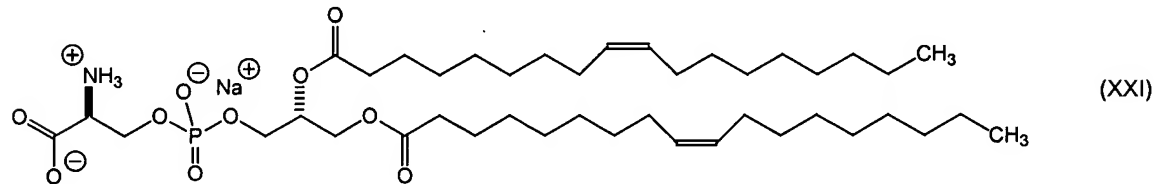
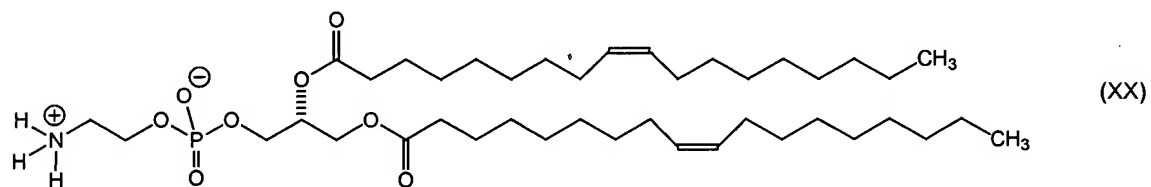
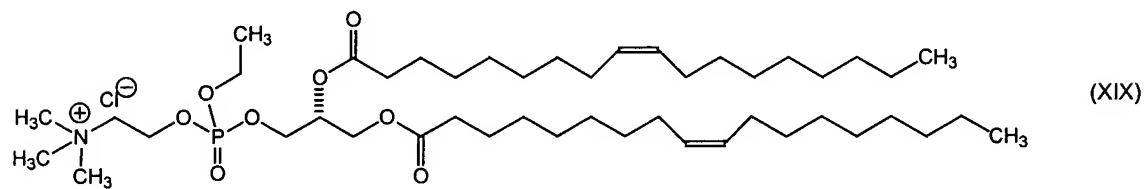
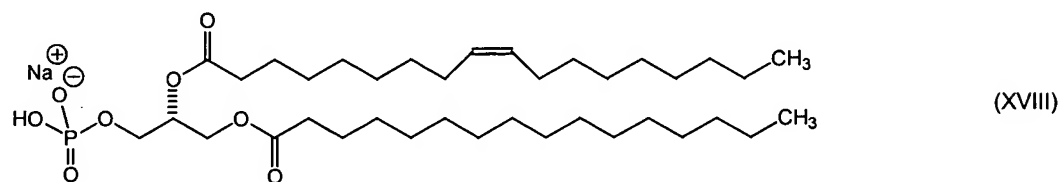
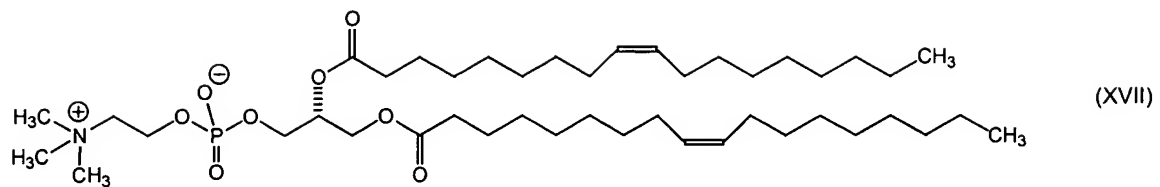
20. The wound-healing composition of claim 14, wherein the wound-treating component comprises becaplermin.

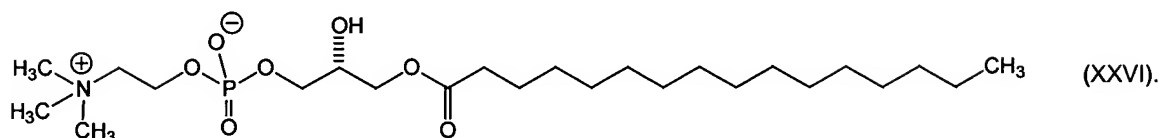
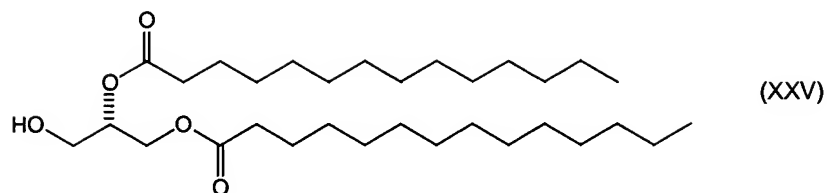
21. A wound-healing composition, comprising:
at least one member selected from the group consisting of becaplermin, an antiseptic, an antibiotic, and an anesthetic; and
vesicles,
wherein the vesicles comprise:

a phospholipid which is a stable vesicle former;
a polar lipid which is not a stable vesicle former; and
ATP.

22. The wound-healing composition of claim 21,
wherein the phospholipid which is a stable vesicle former is at least one member selected from the group consisting of 1,2-dioleoyl-sn-glycero-3-phosphocholine and 1-palmitoyl-2-docosahexaenoyl-sn-glycero-3-phosphocholine; and

wherein the polar lipid which is not a stable vesicle former has the structure selected from the group consisting of formulas (XVII), (XVIII), (XIX), (XX), (XXI), (XXII), (XXIII), (XXV) and (XXVI)





23. The wound-healing composition of claim 21, wherein the vesicles further comprise PEG.

24. A method for promoting wound healing, comprising contacting a wound
5 with the wound-healing composition of claim 1.

25. The method of claim 24, wherein the wound is a superficial wound.

26. A method for promoting wound healing, comprising contacting a wound
with the wound-healing composition of claim 21.

27. The method of claim 26, wherein the wound is a superficial wound.